Amendments to the Specification:

Please replace the paragraph bridging page 4, line 23--page 5, line 10 with the following:

A triple junction is formed in a region of contact between the first surface of the substance serving as the emitter, the first electrode, and a medium (e.g., a vacuum) around the electron emitter. The triple junction is defined as an electric field concentration region formed by a contact between the first electrode, the substance serving as the emitter, and the vacuum. The triple junction includes a triple point where the first electrode, the substance serving as the emitter, and the vacuum exist as one point. According to the present invention, the triple junction is formed by the peripheral portions of the through regions and the peripheral area of the first electrode. Therefore, when the drive voltage is applied between the first electrode and the second electrode, an electric field concentration occurs at the triple junction.

Please replace the paragraph bridging page 8, line 27--page 9, line 15 with the following:

In the above arrangement, a maximum angle θ between the first surface of the substance serving as the emitter and the surface of the first electrode which faces the substance serving as the emitter in peripheral portions of the through regions should preferably be in the range of [[$1^\circ = \theta = 60^\circ$]]$1^\circ \leq \theta \leq 60^\circ$. In the above arrangement, a maximum distance d in the vertical direction between the first surface of the substance serving as the emitter and the surface of the first electrode which faces the substance serving as the emitter in peripheral portions of the through regions

should preferably be in the range of [[0 μm = d = 10 μm]] <u>0 μm < d ≤ 10 μm</u>. These arrangements make it possible to increase the degree of the electric field concentration in the region of the gap, resulting in a larger output and higher efficiency of the electron emission and making the drive voltage lower efficiently.

Please replace the paragraph bridging page 9, line 24--page 10, line 13 with the following:

In the above arrangement, the through regions may comprise holes. The portions of the substance serving as the emitter where the polarization is inverted or changed depending on the drive voltage applied between the first electrode and the second electrode include a portion (first portion) directly below the first electrode and a portion (second portion) corresponding to a region extending from the inner peripheral edges of the through regions inwardly of the through regions. Particularly, the second portion changes depending on the level of the drive voltage and the degree of the electric field concentration. According to the present invention, the average diameter of the holes should preferably be ~~is~~ in the range from 0.1 μm to 10 μm. Insofar as the average diameter of the holes is in this range, the distribution of electrons emitted through the through regions is almost free of any variations, allowing electrons to be emitted efficiently.

Please replace the paragraph on page 13, lines 12-26 with the following:

For example, if the period in which to display one image is defined as one frame, then in a certain period in one frame, all the electron emitters are scanned, and accumulating voltages depending on the luminance levels

of corresponding pixels are applied to a plurality of electron emitters which correspond to pixels to be turned on, thereby charges are accumulated in amounts depending on the luminance levels of the corresponding pixels in the electron emitters which correspond to the pixels to be turned on. In a next period, a constant voltage is applied to all the electron emitters to cause the electron emitters which correspond to the pixels to be turned on to emit electrons in amounts depending on the luminance levels of the corresponding pixels, thereby emitting light from the pixels to be turned on.

Please replace the paragraph on page 24, lines 10-24 with the following:

The upper electrode 14 has a plurality of through regions 20 where the emitter 12 is exposed. The emitter 12 has surface irregularities 22 due to the grain boundary of the dielectric material. The through regions 20 of the upper electrode 14 are formed in areas corresponding to concavities 24 due to the grain boundary of the dielectric material. In the embodiment shown in FIG. 1, one through region 20 is formed in association with one recess 24. However, one through region 20 may be formed in association with a plurality of concavities 24. The particle diameter of the dielectric material of the emitter 12 should preferably be in the range from 0.1 μm to 10 μm, and more preferably be in the range from 2 μm to 7 μm. In the embodiment shown in FIG. 1, the particle diameter of the dielectric material is ~~of~~ approximately 3 μm.

Please replace the paragraph on page 25, lines 15-27 with the following:

In the first embodiment, the upper electrode 14 has a thickness t in the range of [[0.01 μm = t = 10 μm]] 0.01

$\mu m \le t \le 10\ \mu m$, and the maximum angle θ between the upper surface of the emitter 12, i.e., the surface of the convexity 30 (which is also the inner wall surface of the concavity 24) of the grain boundary of the dielectric material, and the lower surface 26a of the overhanging portion 26 of the upper electrode 14 is in the range of $1° \le \theta \le 60°$. The maximum distance d in the vertical direction between the surface of the convexity 30 (the inner wall surface of the concavity 24) of the grain boundary of the dielectric material and the lower surface 26a of the overhanging portion 26 of the upper electrode 14 is in the range of $0\ \mu m < d \le 10\ \mu m$.

Please replace the paragraph on page 27, lines 6-12 with the following:

Particularly, a dielectric material where $n = 0.85$[[-]]to 1.0 and $m = 1.0 - n$ is preferable because its specific dielectric constant is 3000 or larger. For example, a dielectric material where $n = 0.91$ and $m = 0.09$ has a specific dielectric constant of 15000 at room temperature, and a dielectric material where $n = 0.95$ and $m = 0.05$ has a specific dielectric constant of 20000 at room temperature.

Please replace the paragraph on page 36, lines 5-11 with the following:

According to the first embodiment, furthermore, because the gap 28 is formed between the overhanging portion 26 of the upper electrode 14 and the emitter 12, when the drive voltage Va is applied, an electric field concentration tends to be produced in the region of the gap ~~24~~28. This leads to a higher efficiency of the electron emission, making the drive voltage lower (emitting electrons at a lower voltage level).

Please replace the paragraph bridging page 36, line 12--page 37, line 3 with the following:

As described above, since the upper electrode ~~12~~ 14 has the overhanging portion 26 on the peripheral portion of the through region 20, together with the increased electric field concentration in the region of the gap 28, electrons are easily emitted from the overhanging portion 26 of the upper electrode 14. This leads to a larger output and higher efficiency of the electron emission, making the drive voltage lower. In either one of the first electron emission process (the process of emitting electrons accumulated in the emitter 12) and the second electron emission process (the process of emitting secondary electrons by causing primary electrons from the upper electrode 14 to impinge upon the emitter 12), as the overhanging portion ~~16~~ 26 of the upper electrode 14 functions as a gate electrode (a control electrode, a focusing electronic lens, or the like), the straightness of emitted electrons can be increased. This is effective in reducing crosstalk if a number of electron emitters 10A are arrayed for use as an electron source of a display.

Please replace the paragraph on page 37, lines 10-17 with the following:

With the first embodiment in particular, at least the upper surface of the emitter 12 has the surface irregularities 22 due to the grain boundary of the dielectric material. As the upper electrode ~~12~~ 14 has the through regions 20 in portions corresponding to the concavities 24 of the grain boundary of the dielectric material, the overhanging portions 26 of the upper electrode 14 can easily be realized.

Please replace the paragraph on page 39, lines 9-25 with the following:

The overhanging portion 26 of the upper electrode 14 may have upper and lower surfaces extending horizontally as shown in FIG. 2. Alternatively, as shown in FIG. 8, the overhanging portion 26 may have a lower surface 26a extending substantially horizontally and an upper end raised upwardly. Alternatively, as shown in FIG. 9, the overhanging portion 26 may have a lower surface 26a inclined progressively upwardly toward the center of the through region 20. Further alternatively, as shown in FIG. 10, the overhanging portion 26 may have a lower surface 26a inclined progressively downwardly toward the center of the through region 20. The arrangement shown in FIG. 8 is capable of increasing the function as a gate electrode. The arrangement shown in FIG. 10 makes it easier to produce a higher electric field concentration for a ~~higher *larger*~~ larger output and higher efficiency of the electron emission because the gap 28 is narrower.

Please replace the paragraph bridging page 39, line 26--page 40, line 8 with the following:

As shown in FIG. 11, the electron emitter has in its electrical operation a capacitor C1 due to the emitter 12 and a cluster of capacitors Ca due to respective gaps 28, disposed between the upper electrode 14 and the lower electrode 16. The capacitors Ca due to the respective gaps 28 are connected in parallel to each other into a single capacitor C2. In terms of an equivalent circuit, the capacitor C1 due to the emitter 12 is connected in series to the capacitor C2 which comprises the cluster of capacitors Ca.

Please replace the paragraph on page 41, lines 10-15 with the following:

Because the series-connected portion and the remaining portion are connected in parallel to each other, the overall capacitance is 27.5 pF. This capacitance is 78 % of the capacitance 35.4 pF of the capacitor C1 due to the emitter 12. Therefore, the overall capacitance is smaller than the capacitance of the capacitor C1 due to the emitter 12.

Please replace the paragraph bridging page 42, line 21--page 43, line 12 with the following:

As shown in FIG. 14, an electron emitter 10Ab according to a second modification differs from the above electron emitter 10A in that the through region 20 has a shape, particularly a shape viewed from above, in the form of a slit 48. The slit 48 is defined as something having a major axis (extending in a longitudinal direction) whose length is 10 times or more the length of the minor axis (extending in a transverse direction~~)~~ thereof). Those having a major axis (extending in a longitudinal direction) whose length is less than 10 times the length of the minor axis (extending in a transverse direction~~)~~ thereof) are defined as holes 32 (see FIG. 3). The slit 48 includes a succession of holes 32 in communication with each other. The slit 48 should preferably have an average width ranging from 0.1 μm to 10 μm for reducing variations in the distribution of electrons emitted through the through region ~~46~~ 48 for efficient electron emission. The average width represents the average of the lengths of a plurality of different line segments extending perpendicularly across the central line of the slit 48.

Please replace the paragraph on page 44, lines 6-23 with the following:

The characteristics will be described below. If a region of the emitter 12 from which electrons are emitted is defined as an electron emission region, then at a point p1 (initial state) where the reference voltage is applied, almost no electrons are stored in the electron emission region. Thereafter, when a negative voltage is applied, the amount of positive charges in the electron emission region increases, storing electrons. When the level of the negative voltage increases in a negative direction, electrons are progressively stored in the electron emission region until the amount of positive charges and the amount of electrons are held in equilibrium with each other at a point p2 of the negative voltage. As the level of the negative voltage further increases in the negative direction, the stored amount of electrons increases, making the amount of negative charges greater than the amount of positive charges. The accumulation of electrons is saturated at a point ~~P3~~p3.

Please replace the paragraph on page 49, lines 2-5 with the following:

The drive circuit 104 has a plurality of row select lines 106 for selecting rows in the display unit ~~102~~101 and a plurality of signal lines 108 for supplying pixel signals Sd to the display unit ~~102~~101.

Please replace the paragraph on page 52, lines 12-27 with the following:

For example, as indicated by three examples shown in FIGS. 22A through 22C, if the luminance level is low, then the pulse width ~~p~~ Wp of the pulse signal Sp is set to a short width, setting the substantial amplitude to a low level Vsl (see FIG. 22A), if the luminance level is medium, then the pulse width Wp of the pulse signal Sp is

set to a medium width, setting the substantial amplitude to a medium level Vsm (see FIG. 22B), and if the luminance level is high, then the pulse width Wp of the pulse signal Sp is set to a long width, setting the substantial amplitude to a high level Vsh (see FIG. 22C). Though the pulse width Wp of the pulse signal Sp is modulated into three levels in the above examples, if the amplitude modulation is applied to the display 100, then the pulse signal Sp is pulse-width-modulated to 128 levels or 256 levels depending on the luminance levels of the pixels.

Please replace the paragraph on page 53, lines 1-15 with the following:

Changes of the characteristics at the time the level of the negative voltage for the accumulation of electrons will be reviewed in relation to the three examples of amplitude modulation on the pulse signal Sp shown in FIGS. 20A through 20C and the three examples of pulse width modulation ~~on~~ of the pulse signal Spa shown in FIGS. 22A through 22C. At the level Vsl of the negative voltage shown in FIGS. 20A and 22A, the amount of electrons accumulated in the electron emitter 12 is small as shown in FIG. 23A. At the level Vsm of the negative voltage shown in FIGS. 20B and 22B, the amount of electrons accumulated in the electron emitter 12 is medium as shown in FIG. 23B. At the level Vsh of the negative voltage shown in FIGS. 20C and 22C, the amount of electrons accumulated in the electron emitter 12 is large and is substantially saturated as shown in FIG. 23C.

Please replace the paragraph on page 54, lines 9-18 with the following:

The reason for the above range is that in a lower vacuum, (1) many gas molecules would be present in the space, and a plasma can easily be generated and, if too ~~an~~ intensive of a plasma were generated, many positive ions thereof would impinge upon the upper electrode ~~25~~ 14 and damage the same, and (2) emitted electrons would tend to impinge upon gas molecules prior to arrival at the collector electrode ~~62~~132, failing to sufficiently excite the phosphor ~~245~~ 134 with electrons that are sufficiently accelerated under the collector voltage Vc.

Please replace the paragraph on page 55, lines 6-14 with the following:

Such another arrangement is for use in a CRT or the like where the collector electrode 132 functions as a metal back. Electrons emitted from the emitter 12 pass through the collector electrode 132 into the phosphor 134, exciting the phosphor 134. Therefore, the collector electrode 132 is of a thickness which allows electrons to pass therethrough, preferably ~~be~~ 100 nm or less thick. As the kinetic energy of the emitted electrons is larger, the thickness of the collector electrode 132 may be increased.

Please replace the paragraph bridging page 61, line 25--page 62, line 9 with the following:

Thus, a voltage ranging from - 50 V to - 20 V depending on the luminance level is applied between the upper and lower electrodes 14, 16 of the electron emitter 10A which corresponds to each of the pixels to be turned on in the first row. As a result, each electron emitter 10A accumulates electrons depending on the applied voltage. For example, the ~~electron~~ emitter 12

corresponding to the pixel in the first row and the first column is in a state at the point p3 shown in FIG. 16 as the luminance level of the pixel is maximum, and the portion of the emitter 12 which is exposed through the through region 20 of the upper electrode 14 accumulates a maximum amount of electrons.

Please replace the paragraph bridging page 62, line 18--page 63, line 9 with the following:

After the supply of the pixel signal Sd to the first row is finished, in the selection period Ts for the second row, a selection signal Ss of 50 V is supplied to the row selection line 106 of the second row, and a non-selection signal Sn of 0 V is applied to the row selection lines 106 of the other rows. In this case, a voltage ranging from - 50 V to - 20 V depending on the luminance level is also applied between the upper and lower electrodes 14, 16 of the electron emitter 10A which corresponds to each of the pixels to be turned on. At this time, a voltage ranging from 0 V to 50 V is applied between the upper and lower electrodes 14, 16 of the electron emitter 10A which corresponds to each of unselected pixels in the first row, for example. Since this voltage is of a level not reaching the point [[4]]p4 in FIG. 16, no electrons are emitted from the electron emitters 10A which correspond to the pixels to be turned on in the first row. That is, the unselected pixels in the first row are not affected by the pixel signal that is supplied to the selected pixels in the second row.

Please replace the paragraph on page 69, lines 5-9 with the following:

The lower surface 26a of the peripheral portion 26 of the through region ~~2~~ 20 in the upper electrode 14 is

inclined progressively upwardly toward the center of the through region 20. This shape may simply be formed by liftoff, for example.

Please replace the paragraph on page 69, lines 10-17 with the following:

The electron emitter 10B according to the second embodiment is capable of easily producing a high electric field concentration as with the electron emitter 10A according to the first embodiment. The electron emitter 10B according to the second embodiment is also capable of providing many electron emission regions for a ~~higher~~ ~~larger~~ larger output and higher efficiency of the electron emission, and can be driven at a lower voltage (lower power consumption).